



The South Indian Ocean Countercurrent: a return pathway of the Indonesian Throughflow?

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The South Indian Ocean Counter Current (SICC) is associated with a thermal front embedded in a broad eastward flow across the subtropical Indian Ocean and feeds into the poleward Leeuwin Current (LC). Previous studies have shown that the LC and SICC are sensitive to variations of the inflow of Pacific water through the Indonesian Passages (ITF). These subtropical countercurrents, of which the SICC is an example, are characterized by high eddy activity and theoretical work has shown the non-linear nature of their dynamics. That has motivated us to investigate the inertial response to the ITF of the IO circulation. Analysis of two global eddy resolving model runs with the Indonesian Passages open and closed showed that the full 15 Sv of the ITF flows through the Mozambique Channel but only 10 Sv ends up in the Agulhas Current. This suggests that the SICC-LC system forms part of the return pathway of the ITF to the Pacific. Using the Hallberg Isopycnal Model we have investigated the combined effect of ITF, wind- and buoyancy forcing on the Indian Ocean circulation in the inertial boundary layer regime.